AMENDMENTS TO THE DRAWINGS

The attached Annotated Sheet Showing Drawing Changes is submitted in response to the objection to the drawings, with changes to the drawings shown in red ink. A replacement sheet will be submitted shortly to meet all formal drawing requirements.

REMARKS

Reconsideration of this application is requested. The claims submitted for reconsideration are claims 39-43 and 46-47.

Claim 39 has been amended to incorporate the elements of now canceled claims 44 and 45. Since this amendment introduces no new matter or raises no issues not previously considered by the examiner, entry of the amendment is appropriate and requested.

I. Drawings

The drawing was objected to for not including a reference sign regarding "oxygen 30." The attached Annotated Sheet Showing Drawing Changes is submitted in response, with the addition of element "30" shown in red ink. The title "Fig. 1" has also been added so as to correspond with the description in the specification at page 3, lines 11-12.

II. Claim Rejections - 35 U.S.C § 103(a)

Claims 39-44, 46 and 47 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,090,948 (Schwarzenbek) in view of U.S. Patent No. 5,328,593 (Owen). In addition, claim 45 was rejected as being unpatentable over Schwarzenbek in view of Owen, as well as in view of U.S. Patent No. 5,451,313 (Wegerer). The rejections of the claims in this application are traversed, and reconsideration is requested.

Applicant's invention is directed to a reactor system that includes, *inter alia*, a riser reactor, a disengaging zone, a regenerator and a catalyst cooler. The riser reactor has a first end and a second end. The first end includes a feed inlet, and the second end has a diameter greater than that of the first end to impart a superficial gas velocity of 1-20 m/sec. The second end is also externally connected to the disengaging zone.

The claimed system includes a riser arrangement in which the second end has a diameter greater than that of the first end, which means that gas superficial velocity can be increased and that catalyst density can be decreased, as catalyst flows up the riser

reactor. The result is that backmixing of catalyst, feed and product can be effectively controlled so as not to overreact with product and thereby minimize undesirable side reactions.

A catalyst cooler is also included in the claimed system such that the outlet line of the regenerator connects to the catalyst cooler. In addition, the catalyst cooler includes a first catalyst discharge line coupled to the first catalyst discharge line of the disengaging zone, and a second catalyst discharge line coupled to the regenerator for recycling regenerated catalyst to the regenerator.

Schwarzenbek discloses a catalytic cracking process that incorporates a riser reactor zone that has two feed injection points. A lower injection point contacts fresh feed with recycled spent catalyst and a higher injection point contacts partially cracked feed or recycle oil with freshly regenerated catalyst. As a result, a bulk of the contaminants in the feed are deposited on the spent catalyst and a bulk of the cracking is carried out with the regenerated catalyst with a lowered level of contaminants.

The Schwarzenbek riser design differs from the claimed invention in that Schwarzenbek does not externally connect the riser to the catalyst disengaging zone. In addition, Schwarzenbek does not connect a catalyst cooler to the riser reactor.

Owen discloses a catalytic cracking process that uses an external riser reactor. In the Owens process, a catalyst disengaging zone is located directly above the regenerator. The Owens device does not use a catalyst cooler, although Owens depicts a "prior art" catalytic cracking unit that incorporates a catalyst cooler. However, the catalyst cooler is connected to the lower regenerator section and only circulates cooled catalyst directly to and from the regenerator. It does not have the ability to combine cooled, regenerated catalyst with coked catalyst recycle.

Wegerer discloses a FCC process that mixes spent and regenerated catalyst using a blending vessel. According to the specification at column 14, lines 13-18, catalyst entering the blending vessel may circulate through a heat exchanger, and catalyst that is to be cooled may exit either the regeneration zone or the blending zone and be returned either to the regeneration zone or the blending zone.

Details of how Wegerer intends to couple a heat exchanger, i.e., catalyst cooler, into his blending vessel are not disclosed. It is particularly not clear from the disclosure how a catalyst cooler can be arranged such that catalyst from the regenerator circulates through a heat exchanger, enters the blending vessel and is returned back to the blending vessel or the regenerator. It is clear however, that Wegerer does not disclose a catalyst cooler connected to a regenerator in which the outlet line of the regenerator connects to the catalyst cooler and the catalyst cooler has two discharge lines: 1) a first catalyst discharge line coupled to the first catalyst discharge line of the disengaging zone, and 2) a second catalyst discharge line coupled to the regenerator for recycling regenerated catalyst to the regenerator. Such a dual arrangement is particularly beneficial in that temperature control of the catalyst in the riser reactor and the regenerator can be separately achieved. This is of particular value in exothermic reaction processes, such as methanol to olefins reactions processes, where heat is released in both the reactor and regenerator, and it is desirable to maintain separate cooling of the regenerator and regenerator. In endothermic reaction processes such as catalytic cracking processes of the type disclosed by Schwarzenbek, Owen and Wegerer, heat is consumed in the cracking process. So, dual heat control or cooling is not of any particular benefit, particularly in the riser reactor zone. Thus, the combination of the features of the cited references fails to suggest applicant's claimed invention.

IV. Conclusion

Having demonstrated that the cited references, taken either alone or in combination, fail to disclose or suggest the invention as claimed, this application is in condition for allowance. Accordingly, applicant requests early and favorable reconsideration in the form of a Notice of Allowance.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated, since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response. Please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1712 (Docket #: 97B049/4).

Respectfully submitted,

July 15, 2005
Date

Frank E. Reid
Attorney for Applicants
Registration No. 37,918

ExxonMobil Chemical Co.
Law Technology Department
P.O. Box 2149
Baytown, Texas 77522-2149
Phone: 281-834-1743
Fax: 281-834-2495

Annotated Sheet Showing Drawing Changes

Figure 1
MTO High Velocity Fluid Bed Reactor
with Catalyst Recirculation

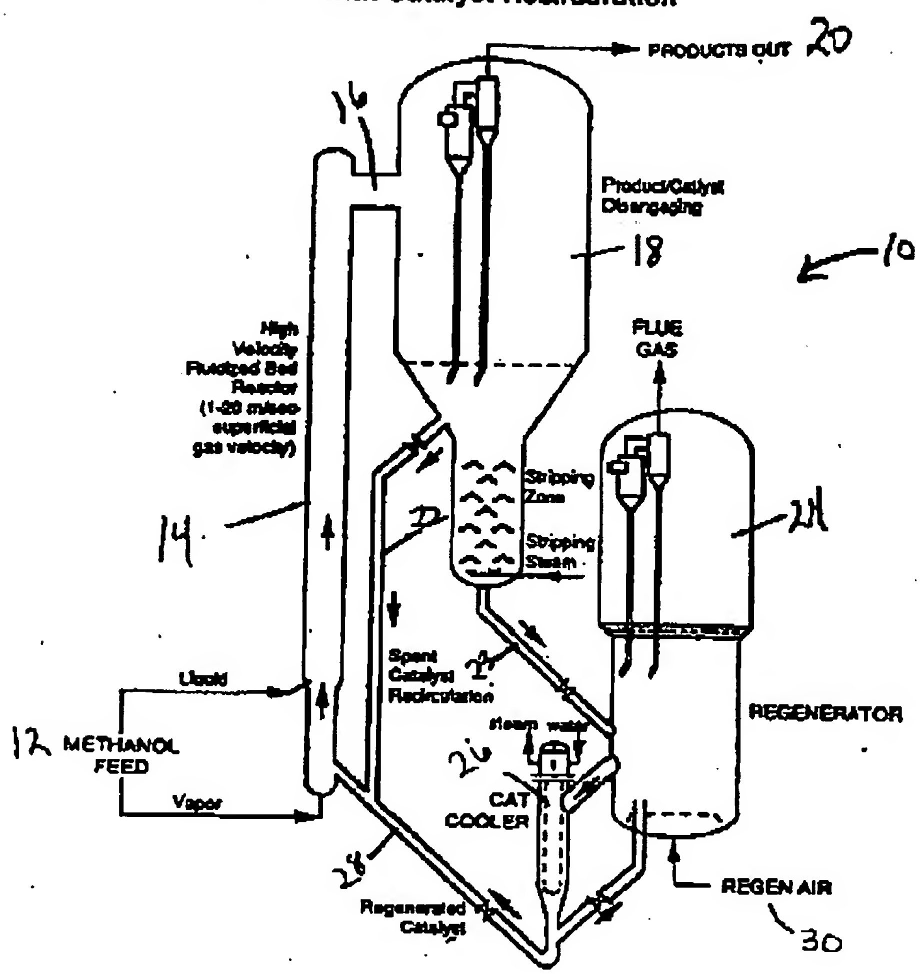

FIG. 1